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# UK Patent Application (19) GB (11) 2 128 337 A

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permit the rotary member to be attached, by means of mount elements (13, 14) in selected openings (4, 4a) to the spokes (15) of any one of various different spoked wheels, and concentrically of the hub (2). A magnetic flux sensor (5) is clamped to the hub by an adjustable clamp means (9, 10, 12) in a position spaced transversely from the rotary member so that in use the sensor senses passage of each magnet past the sensor. The detector can thereby be readily installed in a correct working position on various spoked wheels.

## (54) Rotation detector

(57) A rotary member (1) carries magnets (3) and has a plurality of spaced mount openings (4, 4a) to

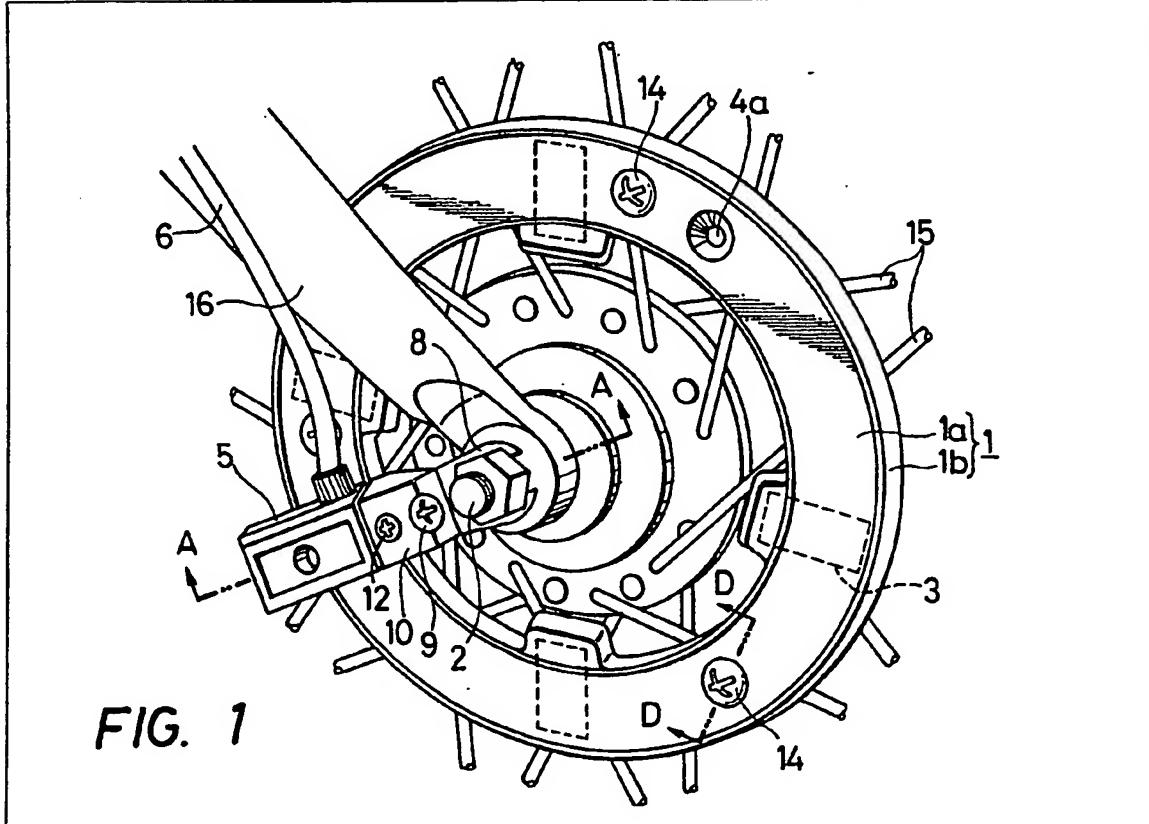


FIG. 1

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FIG. 1

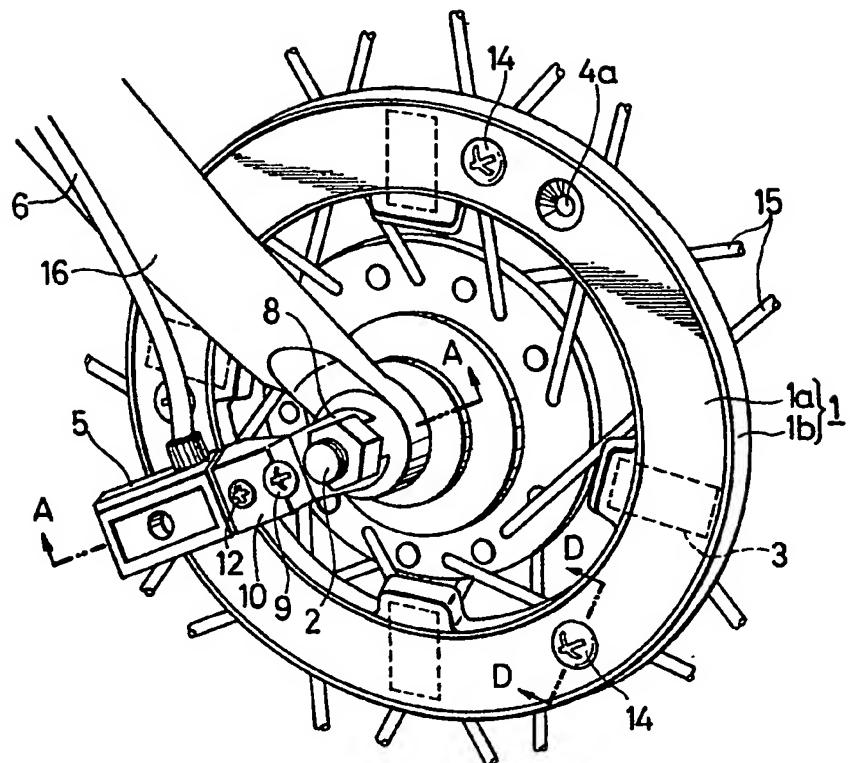
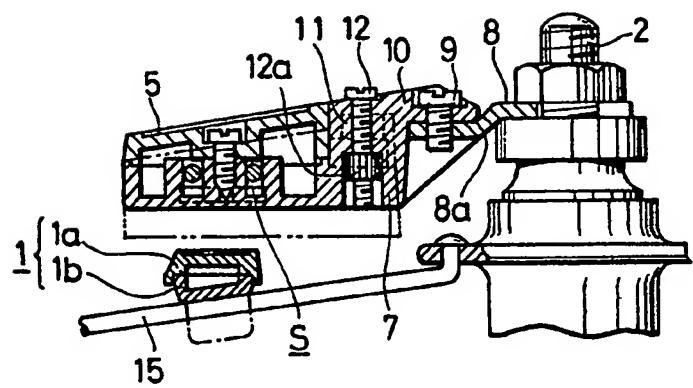


FIG. 2



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FIG. 3

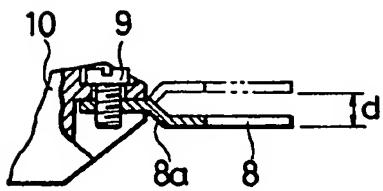


FIG. 4

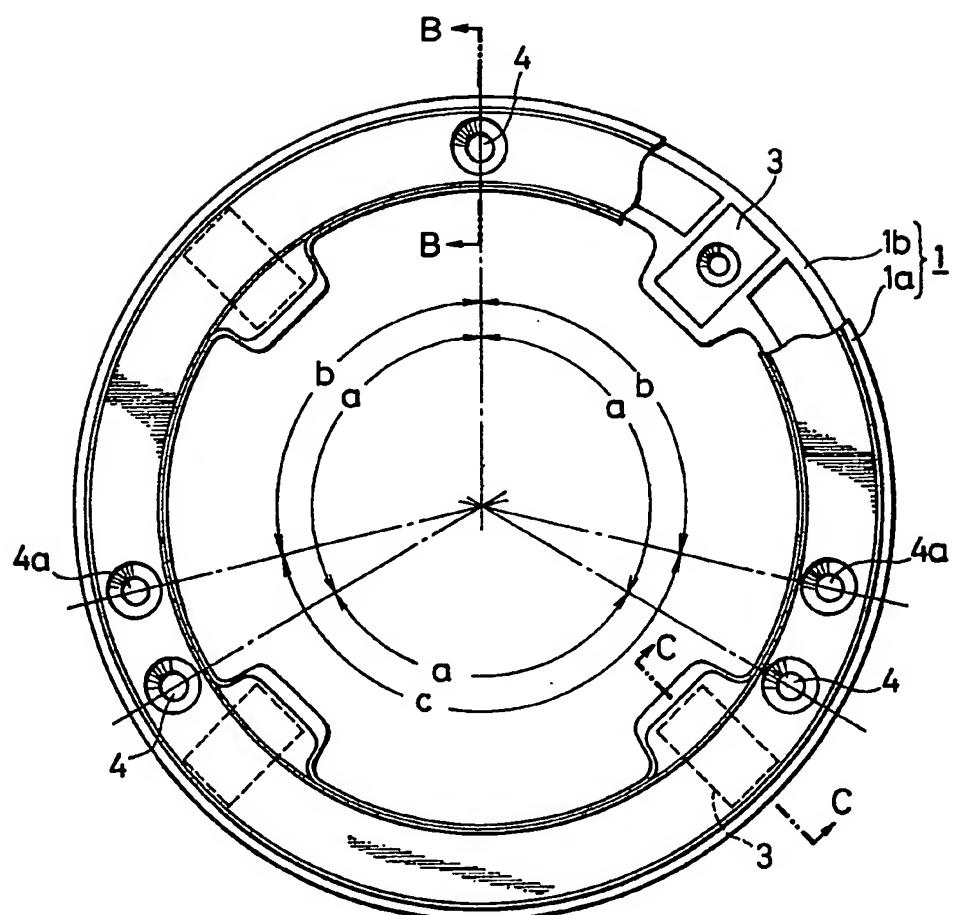


FIG. 5

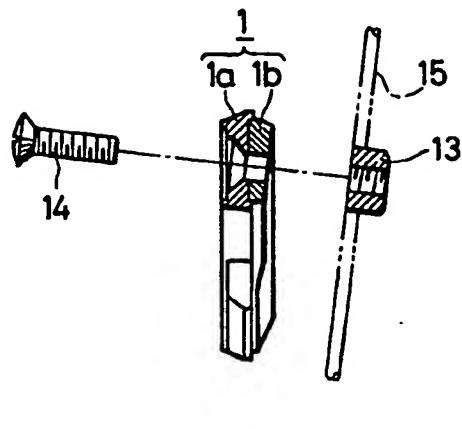


FIG. 6

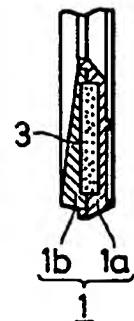


FIG. 7

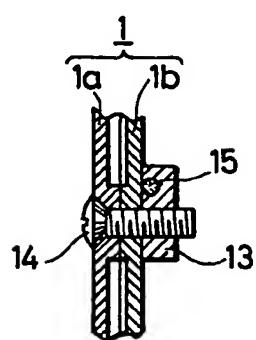
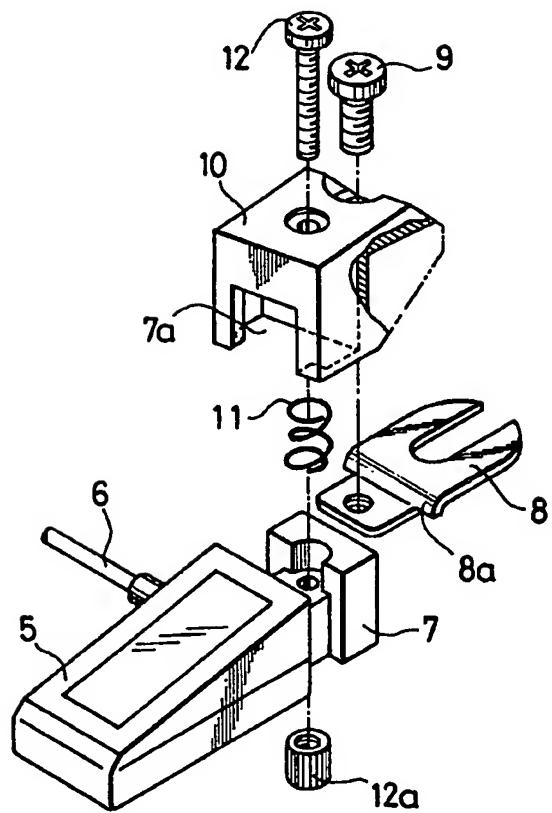


FIG. 8



**SPECIFICATION****Attachment of a rotation detector to a spoked wheel**

The present invention relates to the attachment 5 of a rotation detector, for example an r.p.m. (revolutions per minute) detector, to a spoked wheel, for example of a bicycle, an autocycle and the like.

In Japanese Utility Model Application No. 10 55-181334 the present Applicant discloses a revolutions per-minute detector comprising a rotary member having a plurality of magnets concentrically arranged therein, said rotary member being attached to a portion of a wheel, a 15 detector fixed in a place in such a manner that it faces said plurality of magnets, said detector having a magnetic flux sensing section comprised of at least a lead switch and a resistance, and an operational display for receiving a pulse signal 20 from said detector and indicating digitally the revolutions per minute.

An object of the present invention is to provide an interchangeable arrangement which permits easy and rapid attachment and adjustment of a 25 rotary member and a sensor to a spoked wheel, and its hub, of any wheel of a number of mutually different spoked wheels, without requiring additional fittings.

According to the present invention there is 30 provided a detector adapted to respond to the rotation of a spoked wheel, said detector comprising a rotary member carrying at least one magnetic element and having a plurality of spaced mount openings therein to permit the rotary 35 member to be attached, by means of mounting elements associated with at least some of said mount openings, to the spokes of any wheel of a number of mutually different spoked wheels and concentrically of the hub of that wheel, and a 40 magnetic flux sensor having an adjustable clamping means to permit the sensor to be clamped to the hub of that said wheel and adjusted to a position spaced from the rotary member so that in use said sensor senses passage 45 past the sensor of the or each said magnetic element.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

50 Figure 1 is a perspective view of a detector according to the present invention, shown attached to a wheel;

Figure 2 is a sectional view taken along the line A—A of Figure 1;

55 Figure 3 is a partially sectioned plan view showing the mount plate of the sensor;

Figure 4 is a partially cut away front view showing the rotary member;

Figure 5 is a sectional view taken along the line 60 B—B of Figure 4;

Figure 6 is a sectional view taken along the line C—C of Figure 4;

Figure 7 is a sectional view taken along the line 65 D—D of Figure 1; and

65 Figure 8 is an exploded perspective view of the sensor.

Referring now to Figure 1, a rotary member 1 is formed by putting two annular plates 1a and 1b together, each molded of a non-magnetic.

70 synthetic resin material. As will be seen from Figure 1, the rotary member 1 is mounted concentrically around a hub 2 of a bicycle wheel for co-rotation therewith, and carries a plurality of circumferentially spaced magnetic elements 3.

75 The rotary member 1 is also provided concentrically with a plurality of mount openings 4 and 4a, to permit the rotary member to be mounted, by means of mounting elements associated with at least some of said mount openings, to any one of a variety of wheels without eccentricity (36-spoke wheels and 28-spoke wheels are generally used depending upon the size of the bicycle), i.e., concentrically of the hub of that wheel.

80 It will be noted from Figure 4 that, with a 36-spoke wheel, three mount openings 4 disposed concentrically at equal angles of 120° may be used for mounting, and, with a 28-spoke wheel, one mount opening 4 and two concentric

90 openings 4a may be used. In the latter use, an angle *b* between a line extending through the opening 4 and the center of the circle and a line extending through one opening 4a and the center of the circle is 102.86°, while an angle *c* between two lines running through the two openings 4a and the center of the circle is 154.28°. The present invention is not limited to the above-mentioned arrangements although they are preferred.

95 Referring to Figure 2 a sensor 5 is molded of a synthetic resin material with a built-in magnetic flux sensor S comprising a lead switch, a resistance and other elements. The sensor responds when it enters the magnetic field of each

100 magnetic element 3, and sends the resulting pulse signal via a conductor 6 to an operational display (not shown) attached to a handle bar. The detector 5 has at one end a sliding projection 7. A

105 bifurcated mount plate 8 is detachably clamped onto the hub 2 of the wheel by a clamp screw 9. The sliding projection 7 of the detector 5 is slidingly inserted into a groove 7a formed in an adjuster 10 and is movable along the groove, against the action of a coil spring 11, by an 110 adjusting screw 12 engageable with an internally threaded member 12a.

The rotary member 1 is attached to a spoke 15 by means of a mount screw 14 and a mount piece 13 having a bore, through which the spoke

120 passes, in such a manner that it is positioned concentrically around the hub 2. Making use of the mount plate 8 of the detector 5, the detector 5 is clamped onto the hub 2 with the magnetic flux sensor S spaced away from the magnetic element 3 by a desired spacing. The distance between the

125 sensor S and the magnetic element 3 may be different depending upon the material and thickness of the sensor S and the strength of the magnets 3, and may usually be in the range 2 to

3 mm since too large or small a spacing can result in malfunction or failure. Heretofore, the adjustment of the spacing has been effected by experts.

5 According to the present invention, the detector 5 can be adjusted by insertion or loosening of the adjustment screw 12 of the adjustor 10 by a simple tool such as a wrench or the like, without recourse to experts. In addition, there is no fear

10 that the spacing may vary due to vibration, since the sliding projection 7 and the adjustor 10 are supported by the resiliency of the coil spring 11. The maximum spacing adjustment range is about 4 mm or more depending upon the size and shape

15 of the sliding part.

As will be seen from Figure 3, the mount plate 8 may be formed with a step 8a of a suitable size. If the limit of the sliding adjustment range is reached, the plate 8 is turned over and re-

20 clamped, thereby providing a discrete adjustment by a distance d (Figure 3). The addition of such a step enables, in association with the fine continuous adjustment of the screw 12, any one to mount and adjust easily the present

25 arrangement without recourse to any particular tool or part. In addition, the present sensor arrangement is adjustably positioned within the magnetic field of elements 3 so that precise and stable detection of the magnetic flux can

30 invariably be effected. Furthermore, the present arrangement is inexpensive to mass-produce owing to its simple structure, and can interchangeably be fitted to various wheels.

### 35 CLAIMS

1. A detector adapted to respond to the rotation of a spoked wheel, said detector comprising a rotary member carrying at least one magnetic element and having a plurality of spaced mount openings therein to permit the rotary member to be attached, by means of mounting elements associated with at least some of said mount openings, to the spokes of any wheel of a number of mutually different spoked wheels and concentrically of the hub of that wheel, and a magnetic flux sensor having an adjustable clamping means to permit the sensor to be clamped to the hub of that said wheel and adjusted to a position spaced from the rotary member so that in use said sensor senses passage past the sensor of the or each said magnetic element.
2. A detector according to claim 1 wherein said clamping means comprises a projection slidable in a groove of a grooved member, means for securing the projection in any said adjusted position along said groove, and a hub mount plate detachably secured to said grooved member.
3. A detector according to claim 2 wherein said mount plate is formed with a step and is adapted for attachment in either of two orientations relative to said grooved member, whereby to provide for a discrete adjustment in said spacing of said rotary member and said sensor.
4. A detector adapted to respond to the rotation of spoked wheel, said detector being substantially as described herein with reference to the accompanying drawings.

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DERWENT-WEEK: 198417

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TITLE: Rotation detector for e.g. spoked  
wheel of bicycle - includes magnetic flux sensor with  
adjustable hub clamp to permit variable position from  
rotary member

INVENTOR: MATSUMOTO, M; UEDA, T

PRIORITY-DATA: 1982GB-0028677 (October 7, 1982)

PATENT-FAMILY:

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INT-CL (IPC): G01P003/44

ABSTRACTED-PUB-NO: GB 2128337A

BASIC-ABSTRACT:

The rotary member (1) carries magnets (3) and has several spaced mount openings (4,4a). These permit the rotary member to be attached, by mount elements (13,14) in selected openings (4,4a) to the spokes (15) of any one of various different spoked wheels, and concentrically of the hub (2).

A magnetic flux sensor (5) is clamped to the hub by an adjustable clamp (9,10,12) in a position spaced transversely from the rotary member so that in

use the sensor detects passage of each magnet past the sensor. The detector can be readily installed in a correct working position on various spoked wheels. The mount plate is formed with a step and is adapted for attachment in either of two orientations relative to the grooved member. This provides for discrete adjustment in the spacing of the rotary member and the sensor.

ABSTRACTED-PUB-NO: GB 2128337B

EQUIVALENT-ABSTRACTS:

A detector adapted to respond to the rotation of a spoked wheel, said detector comprising a substantially annular rotary member carrying at least one magnetic element and having a plurality of spaced amount openings therein to permit the rotary member to be attached, by means of mounting elements associated with at least some of said mount openings, to the spokes of any wheel of a number of mutually different spoked wheels and concentrically of the hub of that wheel, and a magnetic flux sensor having an adjustable clamping means to permit the sensor to be clamped to the hub of that said wheel and adjusted to a position spaced from the rotary member so that in use said sensor senses passage past the sensor of the or each said magnetic element.

----- KWIC -----

Basic Abstract Text - ABTX (2):

A magnetic flux sensor (5) is clamped to the hub by an adjustable clamp (9,10,12) in a position spaced transversely from the rotary member so that in use the sensor detects passage of each magnet past the sensor. The detector can be readily installed in a correct working position on

various spoked wheels. The mount plate is formed with a step and is adapted for attachment in either of two orientations relative to the grooved member. This provides for discrete adjustment in the spacing of the rotary member and the sensor.

Derwent Accession Number - NRAN (1):  
1984-103313

Title - TIX (1):

Rotation detector for e.g. spoked wheel of bicycle - includes magnetic flux sensor with adjustable hub clamp to permit variable position from rotary member